COMMENTS ON SOVIET ATTEMPTS TO SEND SPACECRAFT TO MARS AND VENUS

The Soviet Union has pursued a vigorous but unsuccessful program to send instrumented space probes to the planets. Thus far, two attempts have been made to send spacecraft to Mars, and four to Venus. Of these six attempts, only one probe was successfully launched on an interplanetary path, the Venus probe of 12 February 1961. However, it was only a qualified success because its radio transmission failed after several days, long before it reached Venus. None of the five remaining attempts achieved a successful trajectory because of rocket vehicle malfunctions of one sort or another.

The same mission-planning philosophy and vehicle combinations were used on each of the Soviet interplanetary series. A parking orbit technique is consistently exploited, whereby the payload probe and its ejection stage are launched into a low earth satellite orbit, as in the US Mariner program. After one passage around the earth, the fourth or ejection stage is fired over Africa or the Soviet Union. If successful, this sends the instrumented probe on a ballistic path to the planets. Had the launching been successful in each of the six cases listed below, the probe would have arrived at Venus or Mars with too high a

velocity to have been orbited around either planet. Optimum conditions were chosen for each launching attempted thus far so as to either simplify the task of either guidance or to increase the payload [redacted].

1. 10 October 1960: An unannounced attempt to send a probe to Mars failed before a parking orbit was achieved. Had this probe been successful, it would have reached Mars in about 230 days.

2. 14 October 1960: A second attempt to send a probe to Mars, using virtually the same trajectory, also failed before a parking orbit was achieved.

3. 4 February 1961: The first attempt to send a spacecraft to Venus was successfully placed in its earth parking orbit, but could not be ejected into its planned Venus trajectory. The Soviet Union announced the launching as a successful earth satellite Sputnik VII and claimed for it a new weight in orbit record of 14, 300 lbs. Had this probe been successfully ejected, it would have taken about 105 days to reach Venus.

4. 12 February 1961: A partially successful attempt to send a 1, 400-lb. spacecraft to Venus was made on this date. All vehicle stages functioned normally, and the probe was

correctly placed on its interplanetary path. The Soviet Union correctly announced that this was the first time that a spacecraft was successfully ejected outward from orbit. The probe took 97 days to reach the vicinity of Venus. The Soviets reported a failure in the power supply or radio transmitter, and the probe was last heard from at a distance of 4.5 million miles from the earth.

5. 25 August 1962: A third attempt to send a probe to Venus was made on this date. The payload was successfully placed into its satellite parking orbit, but apparently could not be ejected. Had this shot been successful, the probe would have arrived at Venus on about 7 December 1962, ahead of the US Mariner II. It appears that the normal flight time of 112 days for this date was intentionally shortened to 104 days by sacrificing spacecraft weight. This launching attempt has not yet been announced by the Soviet Union.

6. 1 September 1962: The fourth attempt to reach Venus was also successfully placed into a satellite parking orbit, but could not be ejected. The Soviet Union has not yet announced this attempt nor the presence of the unused components in orbit.